

July 20, 1926.

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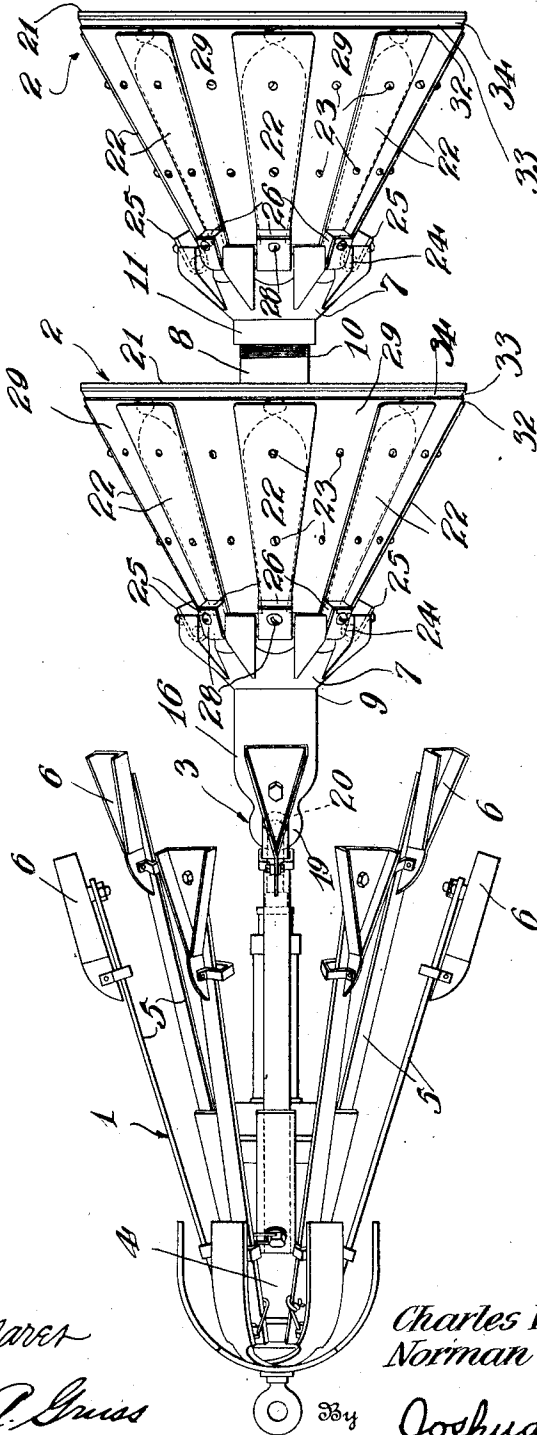
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PIPE CLEANER

Filed May 23, 1924

4 Sheets-Sheet 1

Fig. 1.



Witnesses:

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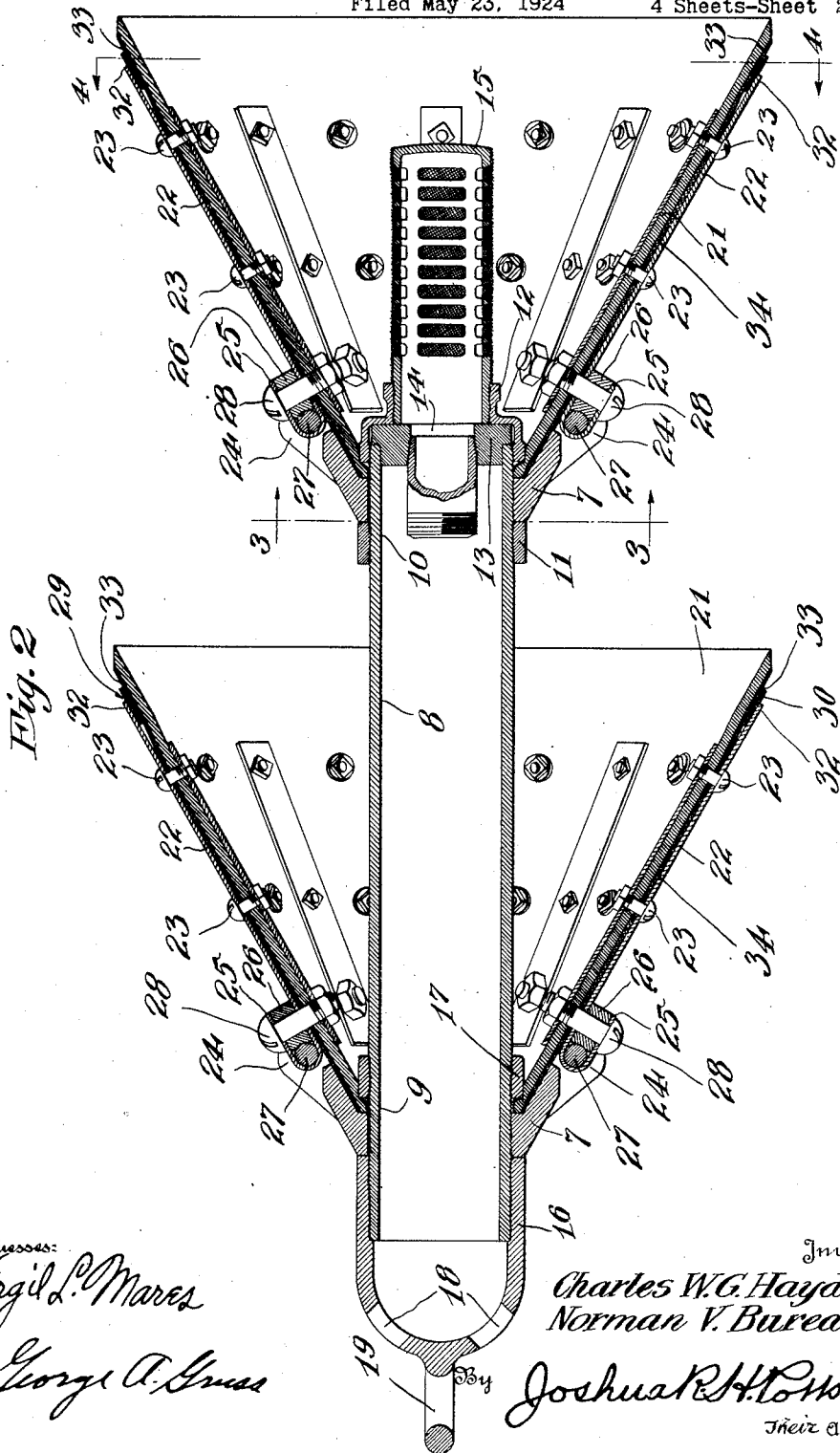
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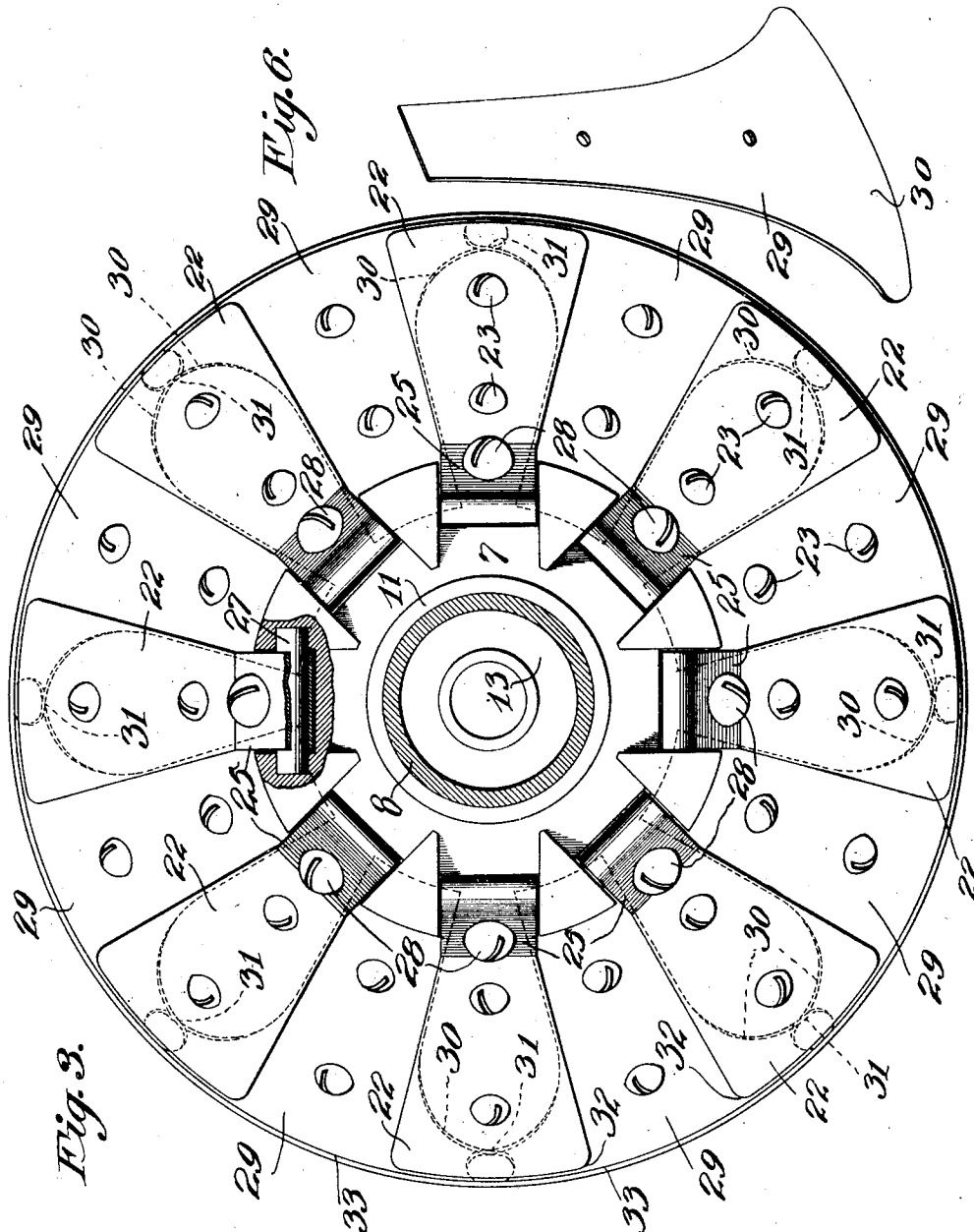
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4 Sheets-Sheet 3



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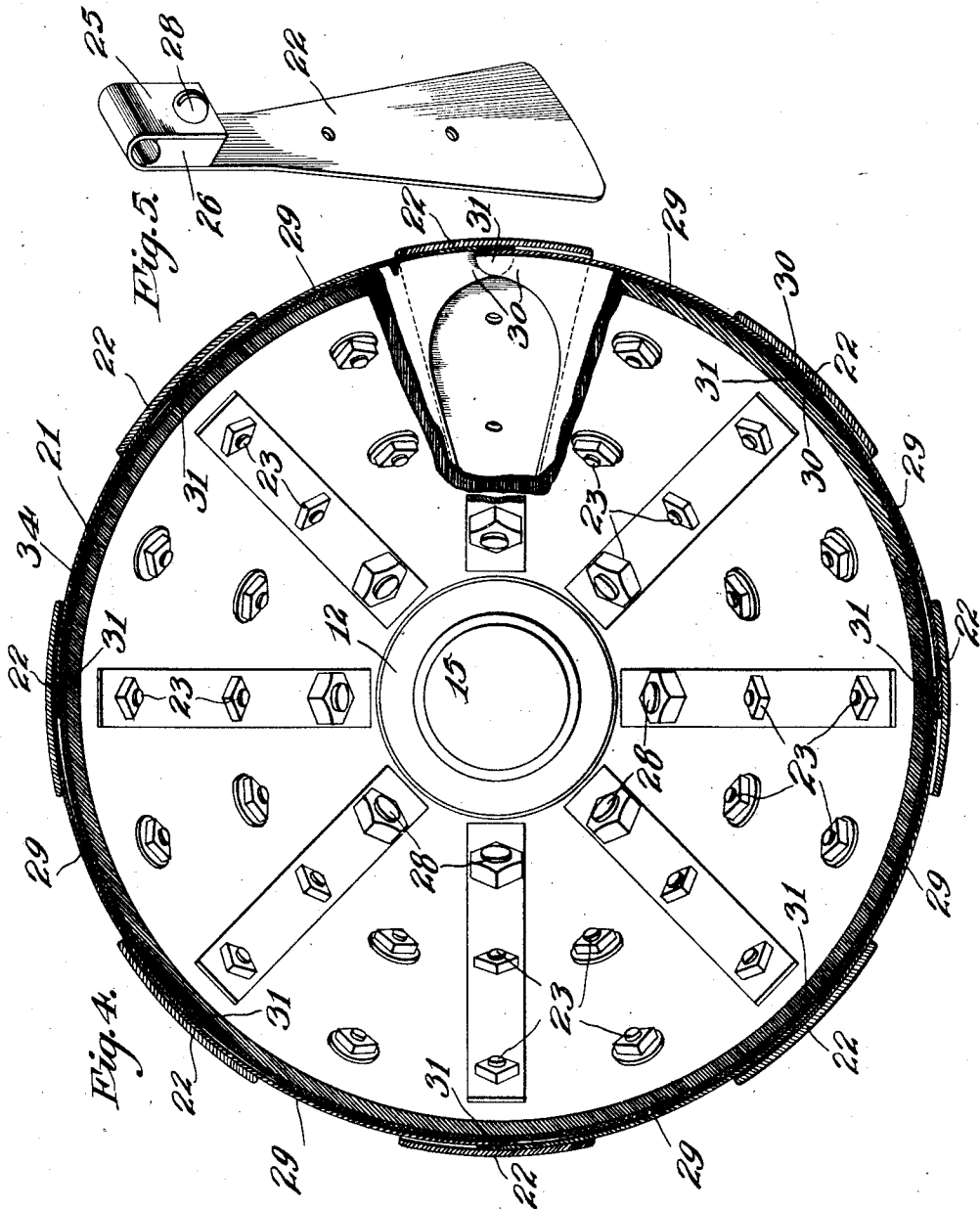
1,593,072

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PIPE CLEANER

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

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PIPE CLEANER.

Application filed May 23, 1924. Serial No. 715,496.

Our invention relates to pipe cleaners adapted for cleaning water pipe lines.

To clean a pipe line, the line is broken to insert the cleaner. The cleaner, which consists of two units, a scraper and a piston, is forced through the pipe line by water pressure. It frequently happens that the moving cleaner is stopped by engagement of its piston with an obstruction in the line, such as an uneven joint, reduced diameter of the line, a bend or a valve of smaller diameter than the line. Before the cleaner can be again started the obstruction must be removed. This is done by digging a hole in the ground, breaking the pipe and replacing the cleaner in the pipe line. This is not only laborious and expensive, but the pipe line is necessarily out of commission for some time, thereby occasioning much inconvenience and, in the case the line is part of a fire preventive system, danger of conflagration.

While the pistons heretofore used yield to some extent to permit them to pass minor obstructions, none of them, so far as we are aware, are capable of yielding to such extent as to permit them to pass a major obstruction, such as a valve of 12 inch diameter in a 16 inch line.

The objects of our invention are to provide pistons for pipe cleaners which, when they contact with an obstruction whether minor or major, will collapse and pass the obstruction then expand to engage the wall of the pipe; to provide an arrangement of pistons which will be effective while passing branch lines and which will pass any ordinary bends in the line, and to provide improved reinforcing means for stiffening the collapsible member and limiting its wear.

These objects, and other advantageous ends which will be described hereinafter, we attain in the following manner, reference being had to the accompanying drawings in which—

Figure 1 is a side elevation of a cleaner having our piston applied thereto,

Figure 2 an enlarged central section through our improved piston shown in Figure 1,

Figure 3 an enlarged section on line 3—3 of Figure 2,

Figure 4 an enlarged section on line 4—4 of Figure 2, and

Figures 5 and 6 are perspective views of

elements which form a part of our invention.

Referring to the drawings, 1 indicates a scraper and 2 a pair of pistons connected to each other and flexibly connected to the scraper at 3. The scraper may be of any suitable type but we prefer to use that disclosed in our Patent No. 1,531,439, of March 31, 1925, and which consists of a body 4 having secured thereto spring plow arms 5 which carry plows 6 on their ends.

Each of the pistons 2 is provided with a head 7 secured, adjacent its ends 9 and 10, to a pipe 8. The rearward head is secured to the pipe, at end 10, by a collar 11 threaded to the pipe at one side of the head and a cap 12 threaded to the pipe at the other side of the head. Cap 12 also secures a collar 13 within the pipe. This collar is provided with an opening 14 to permit passage of water through the pipe to carry forward the solid matter removed from the pipe or other matter which may be in the pipe line. A strainer 15 is screwed to cap 12 to prevent foreign matter from clogging up opening 14. The forward head 7 is secured to the pipe, at end 9, by a bonnet 16 screwed onto the pipe at one side of the head and a collar 17 screwed onto the pipe at the other side. The bonnet is provided with openings 18 through which water, coming through opening 14, passes for washing away foreign matter loosened from the interior of the pipe by scraper 1. An eye 19 integral with the bonnet is connected with an eye 20 on body 4 of the scraper and forms the flexible connection 3. The piston parts attached to heads 7 are alike and but one set will be described.

A funnel shaped collapsible member 21, of rubber or other suitable material, is secured between head 7 and cap 12 at end 10, and head 7 and collar 17 at end 9. This collapsible member is reinforced by a series of strips 22 secured to its outer side by bolts 23 and pivoted to the head. As shown, the end 25 of each strip is looped over a pivot pin 27 cast or mounted in lugs 24 extending from the head. The looped part of the strip extends over a bearing block 26 and is secured thereto by a bolt 28 which also passes through the collapsible member and secures it to the strip adjacent the pivot. Suitable wearing plates 29 are preferably provided

between the reinforcing strips to protect the collapsible member. These plates are arranged with their upper T-shaped ends 30 extending under reinforcing strips 22 and with their edges overlapping, as shown at 31, so that each plate is free to slide relatively to the adjacent plates. The wearing plates extend slightly above the end 32 of the reinforcing strips to a point 33 just within the edge of the collapsible member. The collapsible member is preferably covered with a layer of canvas 34 to protect it from wear by the metallic parts secured to it.

The distance between the pistons should not be more than sufficient to permit passage of a branch line or a major obstruction with one piston always in commission. So arranged the funnel shaped members will collapse sufficiently to permit the cleaner to pass any ordinary bend in the pipe line. We find that in actual use the above described cleaner, when used in a pipe line of 16 inch diameter, will readily pass through valves of 12 inch diameter and we believe it will pass through any valves ordinarily used in pipe lines.

In use, when the piston is forcing the scraper through a pipe and an obstruction is reached, the piston will be collapsed thereby and readily pass over it and, when the obstruction is passed, plates 22 will swing outwardly on their pivots 24 as the piston passes the obstruction.

A single piston in passing an obstruction might collapse to such extent that the leakage would reduce the pressure below that required for moving the cleaner, or the pressure might be likewise reduced in passing a branch connection. With two pistons the danger of such leakage is eliminated and in case one piston is disabled the other will generally be in commission, and the work may go on.

We are aware of Patent No. 1,193,005, to Frank, issued August 1, 1916, which discloses pistons designed for use in pipe cleaning which include a flexible member secured to a rigid disk of considerable size compared with the pipe to be cleaned but the piston disclosed is incapable of collapsing to function as applicants' pistons function.

While we have described our invention as taking a particular form, it will be understood that the various parts may be changed without departing from the spirit thereof, and hence we do not limit ourselves to the precise construction set forth, but consider that we are at liberty to make such changes and alterations as fairly come within the scope of the appended claims.

Having thus described our invention, what

we claim as new and desire to secure by Letters Patent is:—

1. In a pipe cleaner, a piston consisting of a piston head of small diameter relatively to the diameter of the pipe to be cleaned, and a collapsible funnel-shaped driving member having its small end secured to the piston head and its outer edge adapted to engage the interior wall of the pipe to be cleaned.

2. In a pipe cleaner, a pair of pistons, each having a head of small diameter relatively to the pipe to be cleaned, a pipe connecting the centers of the piston heads, and collapsible funnel shaped driving members having their small ends secured to the respective piston heads and their outer edges adapted to engage the interior wall of the pipe to be cleaned, the piston heads being imperforate except for the pipe connection.

3. In a pipe cleaner, a piston consisting of a piston head of small diameter relatively to the diameter of the pipe to be cleaned, a flexible, funnel-shaped driving member having its small end secured to the piston head and its outer edge adapted to engage the interior wall of the pipe to be cleaned, and overlapping metal strips secured to the outer side of the driving member.

4. In a pipe cleaner, a piston consisting of a piston head of small diameter relatively to the diameter of the pipe to be cleaned, a flexible, funnel-shaped driving member having its small end secured to the piston head and its outer edge adapted to engage the interior wall of the pipe to be cleaned, and reinforcing strips pivoted to the head and fixed to the driving member.

5. In a pipe cleaner, a piston having a head; a collapsible driving member secured to the head; reinforcing means pivoted to the head and secured to the driving member, and wearing plates secured to the driving member between the reinforcing means.

6. In a pipe cleaner, a piston consisting of a head; a driving member; reinforcing strips pivoted to the head and secured to the driving member, and overlapping wearing plates secured to the driving member between the strips.

7. In a pipe cleaner, a piston head; a collapsible conical driving member secured thereto, and reinforcing strips secured to the driving member, each strip being provided with a loop at one end, a bearing block within the loop, and a pivot pin extending from the head and taking through the loop.

In testimony whereof we have signed our names to this specification.

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